CUTEC from AOP4 to ZWS

CUTEC NEWS

FACTS · INFORMATION · ANALYSES

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Old Friends and Youngsters

Contact exchanges on the Internet are booming, not only for finding a new friend or partner, but also in searching for "old friends". People suddenly remember classmates from their school days, after not having had any contact with them for years, and now wish to get in touch again; others want to find former colleagues from companies where they once worked. The range of possibilities for searching in various on-line data bases is very extensive. Many colleges and universities also maintain an alumni network with active and former colleagues. Whether from their school, university, or company, a feature which all alumni have in common is a feeling of membership or belonging as a result of entries in the respective data base.

On the occasion of his 80th birthday, which he is celebrating this year, I wish to introduce an "old friend" of CUTEC: Werner Grübmeyer. A search is not necessary in his case, however, since our contact has never been interrupted. He has supported CUTEC for many years and is closely associated with the company's history and development. The honour which he deserves as a person and the appreciation of everything which he has done for us begin right on this page.

Embedded in the work at the Department of Biological and Physical Processes, CUTEC is organising and coordinating the international Conference on AOP – Advanced Oxidation Processes – in Goslar for the fourth time in May. Scientists from all over the world have registered for this conference. Further information on AOP4 is presented in the supplement or on the Internet under www.cutec.de/aop4.php, which is continuously updated. In May, we are also present with our own stand at ACHEMA in Frankfurt, and shortly thereafter at N-EXPO in Tokyo, for presenting our profile on the basis of current projects.

The "youngsters" are the up-and-coming generation of young scientists, who have organised themselves as "NaWis" at CUTEC. They meet at regular intervals for the exchange of experience and maintain close contact with me. Read all about their activities in their report on page 7.

After a long winter with plenty of snow, spring finally arrived shortly before Easter, even in our region. I hope that you enjoyed the holidays.

Yours, Otto Carlowitz

IN THIS ISSUE

Werner Grübmeyer

An "old friend" of CUTEC

Werner Grübmeyer

Werner Grübmeyer, *Ltd. Regierungsschuldirektor*, retired, representative of the Harz Mountain Region in the State Assembly of Lower Saxony for many years, mayor of the former mining town of St. Andreasberg for decades, and honorary citizen of the Technical University of Clausthal, will celebrate his 80th birthday on 1st June 2006. He is still engaged in the activities at the Technical University of Clausthal and Clausthaler Umwelttechnik Institut GmbH (CUTEC-Institut) with amazing enthusiasm and undiminished interest.

Because of his open-minded attitude toward innovation, Werner Grübmeyer was especially interested in the establishment of a research association at the Technical University and later the idea of founding an interdisciplinary research institute for environmental engineering: During the mid-1980's, Prof. Dr.-Ing. Kurt Leschonski, – Rector of the Technical

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Werner Grübmeyer

University of Clausthal at the time – together with other professors at the University, planned and developed a concept for establishing an institute for applied research in the field of environmental engineering and presented it to the State Government of Lower Saxony. They certainly had sufficient contacts with the State Government, of course. For explaining the difficult details contained in the incorporation paper, however, Werner Grübmeyer's diversified contacts certainly proved to be a fortunate asset for interpreting the pros and cons of the model in an expert and expedient manner. The Ministry of the Economy was initially responsible for deciding whether or not an institute should be established; after the change of government, the Ministry of Science was responsible. Thus, the political basis had been established. Convinced of the promising future for the establishment and development of the institution, Werner Grübmeyer took advantage of every opportunity for competently presenting the founding concept at all levels with an emphasis which is all his own.

Ministerial reception at CUTEC; from left: Werner Grübmeyer, Peter Kopischke (member of the Diet in Lower Saxony), Thomas Oppermann (Minister of Science in Lower Saxony, retired), and Prof. Kurt Leschonski (deceased in 2002)

After the affirmative decision by the State Government of Lower Saxony with the pledge to finance the new building, – legally binding appropriation of the funds was confidently awaited after the change of government – but with steadily increasing concern. As the special programs expired at the beginning of the 1990's, the Ministry of Science then decided in favour of a different project. This looked like the end of CUTEC and thus of Prof. Leschonski's vision – but it was a new challenge for Werner Grübmeyer! He had a way of exchanging the various pieces of information in an objective and transparent manner. In personal discussions with the Minister of Finance (shareholder) and the Prime Minister, he successfully and convincingly described the positive development which would result for Lower Saxony with the construction of a new building for CUTEC-Institut. His intensive efforts proved to be a complete success: The cabinet decision was reversed – in favour of CUTEC. Construction could begin, and the interdisciplinary scientific departments could finally continue their work in the new Institute Building in 1995. This working structure was the subject of widespread interest, and contact with the Institute Management was sought through Werner Grübmeyer. Numerous guests were welcomed in lectures and workshops.

Professor Leschonski, Director of the Institute of Particle Technology and Environmental Process Engineering at the Technical University of Clausthal, as well as Managing Director and Scientific Manager of CUTEC from March 1989 to April 2000, esteemed Werner Grübmeyer as a competent comrade-in-arms and advisor with political far-sightedness. Even after Prof. Leschonski's retirement from his activity as managing director, Werner Grübmeyer remained a judicious friend until his death. The friendly relationship with CUTEC has persisted to this day. Thus, after his entrance to office as Managing Director of CUTEC in April 2000, Professor Dr.-Ing. Otto Carlowitz became pleasantly aware of the existing well-founded relations with many public figures. "For me, his familiarity and excellent relations with the political scene on the state as well as federal levels are very helpful for establishing new contacts in the political or ministerial environment, or in opening doors for CUTEC", says Professor Carlowitz.

Engrossed in an interesting discussion: Werner Grübmeyer (l.) and Hans-Heinrich Sander (Minister of the Environment in Lower Saxony) during the dedication of the ArtFuel plant at CUTEC

Werner Grübmeyer has always supported and assisted CUTEC as a friend and advisor, from the initial considerations all the way to the founding day, and beyond. The completion of his eightieth year is a welcome opportunity for the Management and staff of CUTEC to sincerely thank him and to express their esteem. We cordially wish him the very best for the future. (vo)

We extend our congratulations to …

... Dr.-Ing. Hans-Joachim Gehrmann upon receiving his doctor's degree from the University of Weimar. He had previously completed a course of study in process engineering in Stuttgart and Clausthal, with special emphasis on energy process engineering and power engineering, before being employed in a scientific capacity at CUTEC in 1995. His first task was to design and construct a rotary kiln for pyrolysis on a pilot-plant scale in our Institute and put the unit into operation. During the following years, he executed a series of industrial and research orders in the Department of Thermal Processes. In parallel with these activities, he also worked on his doctoral dissertation on the topic of waste pyrolysis in rotary kilns within the scope of a project funded by the DFG. The work was supervised by Prof. Dr.-Ing. Beckmann in Weimar, a former executive at CUTEC. For the continuation of his professional career at FZK in Karlsruhe, we wish him the very best.

... Dennis Mahlert, the first trainee in the Commercial and Accounting Department, for successfully completing his qualifying examination as an accountant after only two years. He has now begun a course of study in business management in Hannover.

Again, we wish to express our sincere thanks to both colleagues for their engagement at CUTEC. (he)

New objectives in sight: Dr.-Ing. Gehrmann (r.) and Mr. Mahlert

INSPIRE

Optimization of systems, energy management and environmental impact in process engineering

In honour of the physicist Marie Curie (1867-1934), the EU is supporting young scientists in a programme bearing her name. One project agreed for the period from January 1 2006 to December 31 2009 is the proposition named INSPIRE. Coordinated by the Institute of Energy Process Engineering and Fuel Technology of Clausthal University of Technology (Prof. Dr. Roman Weber), 16 universities and companies have come together in order to enable 20 scientists, among them 18 PhD students, to conduct research in the field of energy technology. The kick-off took place in the Polish city of Gliwice on February 7 and 8. The network is thematically divided into the working units 1: Optimisation Methods, 2: CFD-Based Software – Energy Generation Through Combustion and 3: Fuel Characterisation. The department Thermal Processes is involved in unit 3, contributing the subject area "pyrolysis" on the scale of 18 man-months. It is planned to train the person to be hired in at least two partner organisations. It is a characteristic feature of the Marie Curie programme that the scientists must not be citizens of the host country. They must be ready to travel extensively and to stay at other institutions for several months. The PhD thesis has to be written in English. The extensive application procedure started in late February and should be finished by the end of June. The details can be found under www.mc-inspire.net. (vd)

MARIE CURIE **ACTIONS**

The state initiative of Lower Saxony invited participants to a fuel cell workshop at CUTEC

One of the three competence centres of the state initiative “fuel cells“ of Lower Saxony is located at CUTEC (as reported in the CUTEC News issue of Dec. 2004). Here, the working topic is “Science and SOFC[1] development”. On March 23, the centre invited all interested scientists in Lower Saxony to Clausthal in order to look at the SOFC technology in detail and to gain ideas for their own fields of research. With approx. 30 participants, the workshop demonstrated that there are already a great number of interested parties in Lower Saxony who want to take part in interchange on the development of SOFC technology.

The lectures by representatives of German research institutions and of relevant industrial enterprises gave a basic overview of the current state of the technology and of the challenges involved in launching it on the market. For decades, the Jülich Research Centre has been a leading research institution in Europe in the field of SOFC. The studies on the topic “metallic interconnectors”, presented by Dr. Huczkowski, showed the enormous depth of scientific analysis that is necessary for all the materials used in SOFC. In his lecture, Dr. Nehter presented the modelling activities conducted at the Hamburg University of Applied Sciences in order to develop and verify new cell concepts. The company H.C. Starck Ltd. is an internationally active enterprise in the field of cell materials and cells, as well as the local representative of industry and the body responsible for the competence centre in the Harz region. Dr. Otterstedt explained the requirements on further SOFC development from the point of view of H.C. Starck, understandably focussing on new materials for electrolytes, anodes and cathodes and their coordinated development. Staxera Ltd., a joint venture between H.C. Starck Ltd. and the car components supplier Webasto, produces commercially available SOFC stacks from the cells made by H.C. Starck. Dr. Wunderlich reported on the challenges to stack engineering and production.

The participants of the SOFC workshop

The lectures by representatives of the universities of Braunschweig, Clausthal and Hanover gave evidence that research institutions in Lower Saxony are also active in the field of SOFC technology. Ms. Fischer introduced the area “Solid Oxide Fuel Cells” at the Institute of Turbomachines and Fluid Dynamics (TFD) of the University of Hanover, whose modelling activities will complement the demonstration operation of the very first 125kW fuel cell facility in Lower Saxony at “enercity” in Hanover. The TFD’s research activities are aimed at the coupling of SOFC and turbomachines. On the part of the fuel cell, they are dedicated to the analysis of failure-relevant mechanisms. Mr. Schlitzberger reported on the activities at the Institut für Wärme- und Brennstofftechnik (Institute of Heat and Fuel Technology) of the Technical University of Braunschweig. Here, research is being done on the design of complete cycles that are based on an innovative planar SOFC structure without bipolar plates with an integrated steam reformer. These cycles realise the principle of the chemical heat pump through direct utilisation of the waste heat from the SOFC. Professor Borchardt from the Institute of Metallurgy (IMET) of Clausthal University of Technology took an active part in the development of the competence centre and makes decisive contributions here. For many years, the working group Thermochemistry and Microkinetics has been doing research on various problems in the field of SOFC. Here, several projects are running both on the development of novel materials and on basic questions in the context of high temperature fuel cells.

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[1] SOFC: Solid Oxide Fuel Cell

3. Workshop "Renewable Energies" in France

Partnership with the French region Haute Normandy intensified

Instigated by CUTEC, a delegation of experts from Lower Saxony travelled to Le Havre in Normandy to attend the third German-French Workshop „Renewable Energies" on December 5 and 6. Scientists from CUTEC, the Clausthal University of Technology and representatives of local centres of competence in innovative technologies, for example the German Wind Energy Institute Ltd. (DEWI), Wilhelmshaven, and the "Institut für Solarenergieforschung GmbH" (ISFH, Institute of Solar Energy Research), Hameln, took part in the meeting in France, which was supported by Lower Saxony's Ministry for the Environment. The meeting took place at the invitation of the University of Le Havre through Prof. Dakyo, head of the working group GREAH (Group de Recherche en Electrotechnique et Automatique du Havre).

Members of the delegation of Lower Saxony with their French hosts at Le Havre

The current research of the participating working groups was presented in lectures on topics of decentralized energy generation, electrotechnical questions about feeding the electricity generated by wind power into the grid, fuel cells and solar thermal energy.

Meanwhile, the cooperation agreement between GREAH and CUTEC, which was signed in 2004, has been intensified: Beyond the continuous exchange of information, the first student exchange schemes started in 2005. It is still a target to establish recognized double-degree courses of study, like those which Clausthal University of Technology is already running successfully in cooperation with the University of Krakow in the study course Mechanical Engineering/ Mechatronics.

One of the objectives of the French, who want to press ahead their research on alternative energies in a country dominated by nuclear energy, is the realisation of the model "Energy Park Clausthal". One of the first facilities in a secondary school in the neighbouring Fécamp could be inspected closely in its start-up phase by the participants of the workshop. The know-how of the Germans, who can look back on several years of successful research and development in this field, is highly appreciated in France; in this area, there are opportunities for successful economic cooperation for mutual advantage.

On the basis of the prepared concepts, it is the aim for next year to formulate joint EU applications and to start common projects, for example in the field "Decentralized Energy Generation". The contacts that have been made with the regional administration of Normandy should speed up this work in applied research. (kra)

New in the CUTEC team

Reinforcement for the operational sectors

Dipl.-Ing. Andreas Goronczy joined the Department of Thermal Processes of CUTEC on January 1, 2006. Mr. Goronczy studied electrical engineering in the Department of Automation Technology at the University of Hanover. At CUTEC, he is responsible, among other things, for the work on the development of innovative control systems for grate firing facilities.

Since January 1, 2006, Ms. Wendy Weber (B.A.) has been supporting the activities of manager international operations, Dr.-Ing. Theodore I. Onyeche.

Ms. Weber was trained as a European secretary at the Dr. Buhmann Academy in Hanover. Subsequently, she graduated with the degree Bachelor of Arts in "International Communication and Translation" at Hildesheim University.

Part of the CUTEC team since January 1: Ms. Weber und Dipl.-Ing. Goronczy

On March 1, 2006, Dipl.-Ing. (FH) Irene Schuma joined the biological laboratory of CUTEC. After her training as a laboratory assistant, Ms. Schuma worked for several years as a biological-technical assistant at the Gesellschaft für Biotechnologische Forschung mbH (Society for Biotechnological Research) in Braunschweig. Subsequently, she studied biotechnology/chemical technology at the University of Applied Sciences Emden. At CUTEC, her sphere of work comprises a wide variety of tasks from the fields of biotechnology and water processing. She will provide valuable support for the sector Biological Processes.

Dipl.-Ing. (FH) Irene Schuma

In the context of a support measure by the national employment agency, Ms. Martina Ketterer is retraining at CUTEC from April 1, 2006. She will be educated as a physical laboratory assistant in the Department of Chemical Processes. (he/wes)

Straw gasification in the circulating fluidized bed

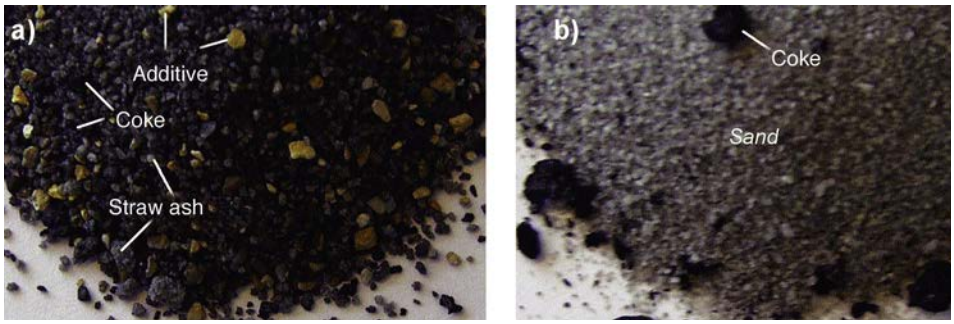
Progress in the production of synthesis gas from complex types of biomass

Large-scale circulating fluidized beds (abbrev. CFB) for electricity and heat generation have been built in Germany for approx. 25 years. The plants are operated mainly in the combustion mode. A wide variety of chopped solids, liquids or suspensions can be decomposed thermally in the same device, if the delivery takes place at different points. It is of particular advantage that a wide range of fuel values can usually be covered, and a surrounding heat carrier such as sand or ash can absorb short-term fluctuations in the energy content of the fuel. The substance class "biomass" started to be utilized in wood combustion plants in the Scandinavian countries in the late seventies. In materials of a more complex chemistry, however, the chlorine (corrosion) and the alkaline metals sodium and potassium (ash melting and collapse of the fluidized bed) were feared.

The wheat straw pellets used

In the years 2003 and 2004, the Department of Thermal Processes constructed a pilot plant scale CFB with connected waste gas purification. The purpose of the pant is the generation of highly purified synthesis gas for fuel production ("ArtFuel concept"). The aim is to obtain procedural parameters and to get insight into relationships that will help in the dimensioning of commercial plants. It is predictable that the wood market will be heavily contested in the future, and that alternative sources of biomass such as straw and energy crops will be utilized. Thermal conversion devices beyond the scope of household-scale equipment will have to meet the requirements.

When the CUTEC CFB was planned, the high demands were already considered. Additional electric heating, special design of the temperature and pressure measurement points as well as steam and oxygen supply should avoid the occurrence of cold spots and a restriction to the air gasification. In addition, a separately cooled input screw feeds the cold fuel directly into the hot fluidized bed and exposes it to a high temperature shock. Separate inlets allow the utilization of two different additives.



a) Ash from straw gasification; b) Ash from wood gasification

During the first months of the year 2005, the plant demonstrated, using wood as a fuel, its suitability for various shapes and grain sizes from wood shavings through wood chippings up to chopped up chipboard. It turned out that in the given configuration the best synthesis qualities can be achieved with pellets. Subsequently, experiments with wheat straw were carried out (see image on the left). In order to raise the ash melting point, which was as low as had been feared, a cheap additive is used. The results not only demonstrated the suitability of the CFB for thermal straw decomposition, but also showed that the quality of the synthesis gas was, surprisingly, far better than that produced using wood. This conclusion results from, on the one hand, the desired high hydrogen content, and on the other hand from the tar content, which was below the detectable limit! Even better qualities could be obtained with residues from sugar production (sugar beet shreds). The complex kinds of biomass have a higher ash content than wood. Because of that, the sand in the fluidized bed needs to be exchanged for new materials (see Image above). The scientific reasons for these novel results are still unknown and should be investigated. With respect to the new energy crops entering the market, it is planned for the future to test them in the ArtFuel plant for their yield of synthesis gas and for the need for operating resources such as steam and oxygen. The corresponding research proposals are awaiting approval. (vd)

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Fuell cell Workshop

Prof. Borchardt's group is also involved in the current project in Clausthal, the "SOFC demonstrator" at CUTEC, which is part of the state initiative (see CUTEC-News, April 2005). His lecture dealt with the works at the IMET on materials development and cell production as well as ongoing cooperation links and planned basic research.

The various contributions from the universities of Lower Saxony highlighted the competences that have already been built up in the scientific landscape of this state, and the opportunities that may arise from more intensive cooperation.

The participants were very taken with the lectures and took with them encouragement and ideas for their work on current tasks. There was consensus that there are quite a few challenges to be mastered in order to develop the SOFC fuel cell to a stage where it is ready for marketing, and that a high tempo is essential in order to cope with the international competition from other developers. At the same time, the present stage of development opens up opportunities for Lower Saxony to participate in the ongoing development process using its proven excellence in research, and to permanently establish decisive detail competence in Lower Saxony. The competence centre and the participants are evaluating the workshop in order to develop joint project ideas and new partnerships from it. The purpose of the competence centre "Science and SOFC development" remains the quest for new Lower Saxony products and business segments in the field of this exciting technology. (di)

E-learning in the CUTEC multimedia lecture hall

Lower Saxony Telecolloquium: Live broadcast of lectures in cooperation with Clausthal University of

View of the multimedia lecture hall during a lecture

What is meant by E-learning? According to a definition by Michael Kerres, Professor of Media Didactics at the University of Duisburg-Essen and one of the pioneers of E-learning in the German-speaking area, E-learning means any form of learning in which digital media are used for the distribution of learning material and/or for communication. E-learning can be based on very different technologies, and may be realized in various didactic scenarios. A current example is the Lower Saxony Telecolloquium as a sub-project of the "E-learning Academic Network Niedersachsen“ (ELAN), which is being supported by the Ministry for Science and Culture of Lower Saxony from 2002 to 2006. The objective of the ELAN project is to promote the utilisation of multimedia in teaching, studying and further education in the universities of Lower Saxony. Hidden behind the rather academic sounding title Lower Saxony Telecolloquium, is an innovative new kind of event in which modern telecommunication technologies are used in order to conduct supraregional, inter-university information and discussion events.

An example: During a lecture, the speaker in the lecture hall of one university (e.g. Clausthal University of Technology) addresses simultaneously the students who are present there and those of another university (e.g. at the University of Göttingen) who are connected live via image and sound. As the photo shows, the overhead projections used by the speaker are displayed on a separate screen, since there is also data transfer between both locations.

It is even possible to discuss or ask questions, no matter on which side of the transmission the participants are located, because the receiving lecture hall also sends picture and sound signals to the sending lecture hall, which allows the speaker to respond to questions from the remote participants as well.

By means of a special programme, both the audiovisual transmissions and the presented graphics can be recorded. Later, they are available to those who are interested via the Internet or on a data carrier that can be ordered via the university library. It is the aim of the Telecolloquium to allow an intensive as well as uncomplicated scientific exchange. At each event location, qualified staff take care of the transmission facilities, so that the lectures and discussions can proceed undisturbed. Those events taking place in the CUTEC multimedia lecture hall are taken care of by our experienced studio director Mr. Knochen. If necessary, he is backed up by the Multimedia Support Centre Clausthal under the direction of Mr. Kiel, which is based in the Multimedia Department of the computing centre of Clausthal University of Technology. (he/kn)

Works council report

After the four-year term of office of the works council, the periodic elections are on the agenda this spring. An election committee headed by Dipl.-Ing. Sven Schäfer is responsible for preparing and holding the elections. Due to the size of the workforce, a seven-member works council is now planned. Two members should be women, corresponding to staff composition. The election will be held on April 27 of this year with subsequent public counting of the votes. The previous works council was constituted by Ms. Carmen Kiefer, Mr. Gerd Cronjäger, Dr. Christian Schröder, Mr. Hans-Adolf Teegen and Dr. Torsten Zeller. They wish to express many thanks to the staff and management for their support and trustful cooperation. (ze)

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DATES

Lower Saxony Day in Melle
CUTEC presentation in the Innovation Park
from July 14 to 16, 2006

The NaWis: Striking a balance

As a consequence of the evaluation conducted in January 2005, several young employees at CUTEC have organised themselves as members of the up-and-coming generation of young scientists – briefly designated as NaWis – (as reported in a previous issue of CUTEC-News). The declared purpose of NaWis is to promote scientific exchange and interdisciplinary cooperation as well as to improve the general conditions for doctoral programs. After one year of NaWis work, the time has come to strike a balance and report on the activities of the organisation.

Special attention was focused on oral presentations by the individual members in their respective fields of work. Talks have been presented on the following topics: "Fuel from biomass", "Mathematical modelling and experimental investigation on the pyrolysis of wastes in rotary kilns", "Gas generator for PEM fuel cells", "Measurement of the local gas velocity at the outlet of a wall-flow particle filter", "Development of a thermal exhaust-gas purification plant with regenerative exhaust-air preheating for exhaust gases containing organosilicon compounds", "Object-oriented modelling – principle, possibilities, applications", "Fischer-Tropsch synthesis", and "Network management". In a talk given by Mr. Sommer upon motivation by the NaWis, these and other employees were informed of the accounting aspects of project execution (calculation, financial planning, funding organisations, demand for financial resources, accounting, etc.).

Special emphasis was also placed on the promotion of contact with the students at the Technical University of Clausthal and the improvement of possibilities for the execution of projects as well as the completion of term papers and Diploma theses at CUTEC. For this purpose, a thesis fair was organised in July; the students thus had the opportunity to inform themselves on the fields of activity at CUTEC by means of posters and exhibits and also to seek direct contact with tutors. Moreover, an employment contract was prepared for projects, term papers, and Diploma theses in cooperation with the Personnel Department and the Management. This contract is designed to improve safeguards for the students and to provide increased motivation by specifying their rights and obligations. Furthermore, directives were prepared for writing theses, term papers, and related documents, with a description of the associated formalities as well as the appropriate structure and appearance.

Finally, two excursions also took place during the year. The first, a visiting tour of the distillery in Nörten-Hardenberg, was inofficial, but certainly appropriate, since it was intended essentially for getting to know each other. The second excursion was of a more professional nature: This time, the destination of the NaWis was the Bundesforschungsanstalt für Forst- und Holzwirtschaft (German Federal Research Institute for Forestry and the Lumber Industry) in Hamburg. They took part in a colloquium, during which Dipl.-Ing. Schindler presented a talk entitled "Biomass-to-Liquid", visited the Institute of Wood Chemistry, became informed of the research activity there, and discussed points of contact and possibilities for joint execution of projects. We wish to express our thanks to Professors Patt and Faix as well as Dr. Meier.

Last, but not least, we also wish to express our sincere thanks to Prof. Carlowitz, who has supported the NaWis from the very beginning, as well as to Mr. Wessels and Mr. Sommer for their friendly cooperation. (re)

Training at CUTEC

Today: Martin Bröhl from the Mechanical Workshop

In past issues of CUTEC-News, we have already reported on training in the Commercial and Accounting Department as well as in the Electrical Workshop. Training in the Mechanical Workshop is the subject of today's report. Since the summer of 2005, Mr. Bröhl has been in training as an industrial mechanic in the field of machine and systems technology with appropriate guidance by Master Mechanic Ralf Bauer, Head of the Mechanical Workshop. A highly diversified training program is guaranteed here at CUTEC, since the construction of new pilot plants and prototypes as well as the maintenance of these facilities during operation present a constant challenge to the employees of the mechanical workshop.

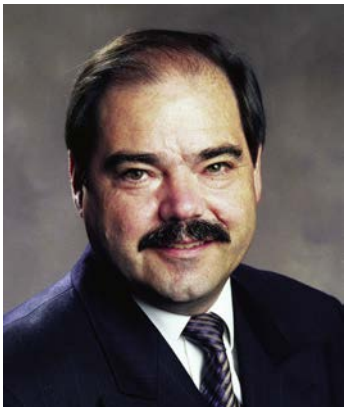
The proper use of machines has to be learned! Master mechanic Ralf Bauer (r.) demonstrates the correct operation of the milling machine to "his" trainee, Martin Bröhl.

After completion of their training, industrial mechanics specialised in machine and systems technology are employed wherever the construction and maintenance of machines and production systems are required. Their daily work includes a wide variety of tasks: They have to test and maintain engines, production machines, machine tools, and special-purpose machines of all kinds, put new machines into operation, and ensure the functional capability of the existing machinery by performing professional repairs. To an increasing extent nowadays, machines of different types must also be interlinked to form complex systems. The wide range of activities imposes corresponding demands on versatility and skill. For instance, exact knowledge of the tolerances in shape and position as well as the application of this knowledge are necessary for assembly wherever a particular dimension must be observed during milling and filing of fits (see photograph).

A prerequisite for training is the successful completion of one's finished elementary or secondary technical schooling. Furthermore, one should have a more profound understanding of mathematical and physical relationships, as well as practical skills, of course. After training, one can continue one's education to qualify as a technician or pass the examination to become a master mechanic after several years of professional experience. One can also complete a course in engineering at a university of applied sciences. The duration of Mr. Bröhl's training program is 3.5 years; he already passed his intermediate examination in March. (ba/he)

Scientific Advisory Board at CUTEC:

Dr. rer. nat. Heinz Heumüller: A personal profile



Dr. Heinz Heumüller

Since 2003, Dr. Heinz Heumüller has served as Chairman of the Executive Board at H.C. Starck GmbH in Goslar, which became a Bayer subsidiary in 1986. Dr. Heumüller was born and raised in Trier on the River Mosel. He studied chemistry at the University of Köln and completed his doctoral program under Professor Baudler at the Institute of Inorganic Chemistry in 1979. The topic of his dissertation was the oxidation of diphosphane. After receiving his doctor's degree, he pursued postdoctoral studies at the University of Texas in Austin, USA until the end of 1980.

In December 1980, Dr. Heumüller began his work at Bayer. At the plant in Leverkusen, he was first employed in the Department of Inorganic Research; topics included solar silicon, tantalum, and electrochemical fluorination. He subsequently served as plant manager in the field of chemistry for fluorides, electrofluorination, and dichromate. At the end of 1992, he was appointed as manager for the Divisions of Chemistry, Special Products, and Fibres at the Bayer plant in South Africa. His responsibilities included the chromium ore and fluorite mines as well as the production of chrome tanning agents.

In 1997, he returned from Africa and was appointed as manager of production and technology for phosphorus chemicals in Germany. From 1998 to 1999, Dr. Heumüller was responsible for the worldwide field of business with basic inorganic chemicals, especially chlorine-alkali electrolysis, sulphuric acid, and hydrofluoric acid. In that year, he was appointed as Chairman of the Executive Board at Bayer Solar. As of February 2001, Dr. Heumüller served as Executive Vice President of the Bayer Corporation in the United States and as President of the Industrial Chemicals Division in Pittsburgh, Pennsylvania. He was responsible for special products as well as business with organic and inorganic chemicals. In the course of reorganisation within the Bayer Combine, he supervised the disincorporation of the Bayer Chemicals Division of the combine in North America as an independent company and subsequently served as president there.

At the beginning of 2003, he returned from the United States to Germany, since he had been appointed as Chairman of the Executive Board at H.C. Starck GmbH in Goslar. In this function, he has been directing the worldwide activities of the H.C. Starck Group ever since. The company is specialised in the production and processing of metals with a very high melting point, the so-called refractory metals, such as tungsten, molybdenum, tantalum, niobium, and rhenium, with melting points up to 3500 °C. Moreover, companies of the group manufacture high-performance ceramics and the associated input materials, as well as conductive polymers for applications in electronics. The group employs a total of more than 3400 persons at 14 locations in Europe, the United States, Canada, and Asia; in 2005 the earnings amounted to about 920 000 000 Euro worldwide.

Upon recommendation by Professor Beck and Professor Carlowitz, Dr. Heumüller has been appointed to the Scientific Advisory Board at CUTEC. Prof. Carlowitz has expressed his motivations as follows: "Dr. Heumüller is an established personality on the economic sector of the chemical industry and is a benefit to the Advisory Board because of his profound knowledge of the relationships in this context."

For Dr. Heumüller, CUTEC deserves special priority because of its engagement on the socially important sectors of resource efficiency and emission reduction. "I myself have consistently implemented and promoted the responsible-care concept in the chemical industry during my entire professional career. As a result of my professional experience, I have gained many concrete points of contact with the topics under investigation at CUTEC, particularly in the field of renewable energy sources (Bayer Solar, H.C. Starck Fuel Cell Project). Not only my industrial experience is decisive here; I can also establish contacts with possible project partners or customers for CUTEC" – said Dr. Heumüller in a statement concerning his engagement in the Scientific Advisory Board at CUTEC. Such a concrete point of contact with CUTEC has resulted from the developments currently in progress in the field of high-temperature fuel cells at H.C. Starck. A further partner intensively engaged in this field is the Technical University of Clausthal, which has combined its competence on the sectors of environmental engineering and energy systems technology with that of CUTEC. Thus, customised solutions to problems can be developed, primarily for small- and medium-sized enterprises. (he)

The Steering Team

The company development process which was successfully launched last year (see CUTEC-News, December 2005 issue) has entered a new phase. The steering team for supporting the process is now operating independently. The team, which is external to the hierarchy, includes representatives from the Management as well as members of the operative and supporting departments. The group leader is the Chairman of the Workers' Council; his representative is Mr Wessels. Working conferences are held at regular intervals of about four weeks. The results are regularly submitted to the Management. Personnel development, empowerment of the employees, and communication are primary working issues. In this context, eighteen individual actions have been resolved. These can be summarised in terms of two central projects as supporting columns: the development of the company culture as well as the development of the synergistic culture. These central columns are indispensable building blocks for the establishment of a self-learning system. The continuing development of CUTEC toward excellence is thus fostered. The existing broad-based agreement and cooperation by the employees contributes substantially to the successful implementation of the measures. The initial success of the work is measurable. We wish to express our sincere thanks to Prof. Carlowitz for the initiation and active support of the company development process. (ze)